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Systolic blood pressure modifies the relationship between coronary artery calcification and adverse kidney outcome: results from KNOW-CKD

Young Su Joo¹, Hee Byung Koh², Jung Tak Park³, Tae-Hyun Yoo³, Kook-Hwan Oh⁴, Shin-Wook Kang³, Seung Hyeok Han³

¹Department of Internal Medicine-Nephrology, Yongin Severance Hospital, Korea, Republic of

²Department of Internal Medicine-Nephrology, Catholic Kwandong University International St. Mary's Hospital, Korea, Republic of

³Department of Internal Medicine-Nephrology, Severance Hospital, Korea, Republic of

⁴Department of Internal Medicine-Nephrology, Seoul National University Hospital, Korea, Republic of

Objectives : Previous studies evidenced that elevated coronary artery calcium (CAC) score is associated with higher chronic kidney disease (CKD) progression. However, the use of CAC score to guide CKD management has not been adequately evaluated. Here, we evaluated whether presence of CAC modify the association between systolic blood pressure (SBP) and CKD progression in patients with CKD.

Methods : We analyzed 1693 participants with non-dialysis CKD from KNOW-CKD. Key exclusion criteria were kidney failure with replacement therapy (KFRT) and missing data for CAC and SBP. We categorized participants according to baseline SBP and CAC score (Controlled BP, SBP<120mmHg; Elevated BP without CAC, SBP 120-140 mmHg and CAC score=0; Elevated BP with CAC, SBP 120-140 mmHg and CAC score >0; Uncontrolled BP, SBP >140 mmHg) and compared the CKD progression. The CKD progression was defined as a composite of halving eGFR from baseline value or onset of KFRT.

Results : During 10,023 person-years, the composite outcome occurred in 689 (40.7%) participants among the KNOW-CKD participants. There was significant interaction between CAC score and SBP for CKD progression ($P<0.001$). In crude Cox regression, compared to controlled BP, elevated BP with CAC group showed similar CKD progression risk (Hazard ratio [HR], 1.17; 95% confidence interval [CI], 0.95-1.44), whereas other strata group showed increased risk of CKD progression (elevated BP with CAC; HR, 1.59; 95% CI 1.31-1.94 and uncontrolled BP, HR, 1.94; 95% CI 1.56-2.41). Similar elevated risk in elevated BP with CAC was observed even after adjustment of age, sex, diabetes mellitus, estimated glomerular filtration ratio, and proteinuria (HR, 1.26; 95% CI, 1.02-1.56). However, the risk of CKD progression in elevated BP without CAC group was comparable to controlled BP group (HR, 1.20; 95% confidence interval, 0.87-1.66).

Conclusions : Elevated SBP was more strongly associated with an increased risk of adverse kidney outcomes in patients with coronary calcification.